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# Knowledge Attitude and Practice of Educators Allied Health and Direct Care Professionals Dealing with Autistic Children: A Non-Randomized Quasi-Experimental Pretest-Posttest Study

Jatheender Kumar*

*Doctorate in public health; Capella University, Minnesota, USA. 2023*

*Email: jatheenderkumar@gmail.com*

**Abstract**

A knowledgeable, well-trained professional dealing with autistic children can minimize or reduce challenging behaviors. However, educators, allied health, and direct care professionals need to be adequately trained and equipped to meet these challenges daily in giving evidence-based care. This quasi-experimental pretest-post test study investigates whether an evidence-based intervention, autism spectrum disorder-care pathway (ASD-CP), has significantly changed the knowledge, attitude, and practice and the importance of educating these professionals. A pretest and post-test survey questionnaire were used, with the intervention taking place at two different locations, one at the school of autism and another in a group home of the institute. The results indicate the training effectively improved participants' knowledge measured by using the survey questionnaire. Similarly, the increase in average participants' scores of their attitudes, interests, and perceived self-efficacy toward individuals with ASD indicates the training was practical and effective. Notably, there was an increase in participants' awareness of structured training, relationship development, joint attention, and naturalistic teaching techniques after the training. The study suggested increased knowledge, attitude, practice, and professional awareness of interventions as evidence-based practices in educators, allied health, and direct support professionals dealing with ASD children during the twelve weeks of the study at the institute.

***Keywords*:** social communication; autism spectrum disorder-care pathway; applied behavior analysis; knowledge; practice; perception.

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* Corresponding author.

## 1. Knowledge Attitude and Practice of Educators Allied Health and Direct Care Professionals Dealing with Autistic Children

"Autism spectrum disorder (ASD) is characterized by marked deficits in social communication and social interaction and the presence of restricted, repetitive behaviors and interests" [1]. Children affected by the disorder spend most of their time in fixed activities and engage in disturbing and challenging behaviors that are different from those of typical children. It is a neurodevelopmental disorder, which means brain functions are affected or compromised. Autism became a recognized federal category for special education classification in 1990 [2]. In its annual report to the Congress in 2021, the Department of Education noted that autism had increased exponentially by 25 % each year. The authors in [3:778] found approximately one in one hundred have been diagnosed on the autism spectrum worldwide.

The term " spectrum disorder" refers to the wide variation in disorders as well as addressing the level of severity of the disorder. In essence, the term denotes the differences from one individual to another in terms of symptomology [4]. Although ASD occurs in all groups, races, and ethnicities it is predominantly identified and diagnosed in Caucasians more often than Black or Hispanic population [4: S58]. Also, the authors in [4: S58] noted the differences could be related to the stigma of the disorder and might be a contributing factor. The authors in [5: 4] their study noted that a lack of health insurance and decreased access to health care services may also contribute to the diagnosis of the disorder in the minority population. The authors in [6] summarizes understanding the epidemiology of ASD can facilitate health program and policy changes.

The World Health Organization, in their meeting report in 2013, stressed the need to enhance the knowledge of professionals who can provide evidence-based care on autism and other developmental disorders. It also noted the urgency to strengthen health system capacities to offer integrated services for ASDs. It stressed that primary healthcare providers have an essential role in early detection of the disorder [7: 9, 13, 17].

## 2. Significance of the Capstone and the Impact of the Project on the Organization

The institute was founded 65 years ago and provides educational and rehabilitative services for children aged five to twenty-one with neurodevelopmental disorders and other special needs. The institute workforce comprises clinicians, behavioral specialists, behavioral analysts, educators, allied health, and direct care professionals from various countries with different educational backgrounds, races, and ethnicities, with more than two hundred employees.

The improvements will be related to the success of the knowledge, attitude, and practice program to educate professionals dealing with ASD children and increase their knowledge base in twelve weeks. The current state baseline measures will not compare to the future baseline measurements because, at this time, no baseline data is available for the project. Implementing the program and educating professionals dealing with autistic children on future state measures will positively impact the organization by providing evidence-based care (EBC). The study of preschool teachers, allied health's, and direct care professionals' knowledge and attitudes may help better understand autism and early intervention efforts at the institute.

## 3. Requirements for the Capstone Project

The institute employs educators, allied health, and direct care support professionals whose educational backgrounds vary, are educated in various countries, and come from multiple cultures and backgrounds. This project/study will focus on educators, allied health, and direct care support professionals' beliefs, knowledge, attitudes, perceptions, and practices in dealing with autistic children.

The administrator believes understanding their staff's perception and practice and increasing their knowledge, attitude, and training would be a step forward in better serving these children from different cultures, races, and ethnicities. The institute foresees an evidence-based intervention that would help better understand and improve caregiving at the institute. The project evaluates if an evidence-based practice (EBP) education training caregiving program will influence their knowledge, attitudes, and practices dealing with autistic children.

## 4. Literature Review

Primary literature was MEDLINE via PubMed Interface PsycINFO (Psychology and psychiatry literature). CINAHL revealed no unique studies about increasing knowledge, attitudes, and practices. Most of the search strategy was manually searching the reference lists of studies in ASD. Search terms and vocabulary terms of autism spectrum disorder and knowledge, attitude, and practice served as the foundation for search strategies on Google Scholar. MEDLINE vocabulary terms, including mass screening of ASD, knowledge of autism, practices, parental beliefs of autism, and early diagnosis of ASD, were used in the search strategy.

Initially, more than 500 articles were retrieved. However, 20 articles were used for the literature review. The inclusion criteria were:

1. Peer-reviewed.
2. Published within the past five years.
3. Available only in the abstract were excluded.

The emerging themes include (a) ASD knowledge among service providers and (b) the effectiveness of professional training on ASD knowledge and attitudes.

## 5. ASD Knowledge among Service Providers

Several researchers have reported knowledge and awareness of ASD among service providers in [8: 222], [9: 1], Reference [10: 1902], [11: 679], [12: 33], [13: 6]. In their study, Ma and his colleagues in [9: 5] noted that the staff demonstrated low general knowledge and awareness about ASD and interventions and treatments. Based on their results, the authors in [9: 9] recommended that childcare workers' levels of knowledge and awareness should be improved through training and knowledge dissemination.

The authors in [9: 1] , [10: 1902] found that physicians had a low level of awareness regarding ASD. Recommendations from the study in [10: 1902] included the addition of lectures during residency training and

clinical exposures to ASD. The authors in [12: 31] found that most health care workers and pediatricians (98.6%) were aware of ASD. The authors in [9: 5] , [12: 31] found that health care workers with more practice experience acknowledge that children with ASD need special education. Also, participants with higher levels of schooling understood the difference between ASD and schizophrenia [12: 33].

Supporting the authors in [9: 7] , [10: 1903] findings, Namuli and his colleagues in [13: 1] found that a notable number of participants, including psychiatrists, clinical psychologists, pediatric nurses, and psychiatric residents, had limited knowledge about ASD. Specifically, the authors in [13: 1] found that 36.1% of the participants scored below average. Based on these findings, the authors in [13: 8] concluded that there is an urgent need for training on ASD, especially among allied health care providers, supporting the need for the proposed project. The authors in [8: 223] found varying knowledge and beliefs about ASD among psychiatrists, pediatricians, occupational therapists (OTs), and clinical psychologists (CPs). The authors in [8: 223] concluded that health care providers need continued education about developing changes in ASD diagnosing criteria.

Unlike the authors in [9: 7] , [10: 1903], Akhter and his colleagues [11: 678] and Rahbar and his colleagues Reference [14: 13] concluded awareness of ASD is high among educators, and allied health practitioners. Like Akhter and his colleagues [11: 680], Rahbar and his colleagues [14: 1] found that most of the physicians (73 to 94%) correctly responded to fundamental questions about ASD knowledge. Gomez-Mari and his colleagues in Reference [15: 1] found that knowledge of ASD was higher among early childhood teachers, university professors, and prior training with students on the spectrum. Similarly, the authors in [15: 1] , [16: 282] found poor knowledge levels about ASD among elementary school teachers (82.3%) compared to only 2.5% who had good knowledge. Based on their findings, the authors in [16: 291] concluded that the participants had inadequate knowledge levels about ASD, supporting the implementation of training in the proposed project. Also, the authors in [17: 1] found inconclusive results on teachers' attitudes toward ASD. Some teachers' reported negative attitudes, others reported positive, and some reported neutral. The authors in [17: 1-3] noted that knowledge, experience level, and training moderated teachers' attitudes toward ASD. The authors in [18: 4] found that most teachers (48.7%) lacked knowledge of ASD.

Lui and his colleagues in [19] conducted a survey/pilot study in China to discover the knowledge and attitudes regarding the disorder in preschool teachers. They noted that a lack of graduate-level education may have contributed to adequately understanding the disorder and providing care. Four hundred seventy-one preschool teachers in Guangzhou and Foshan, China, completed questionnaires assessing participants' demographics, knowledge of typical child development and understanding of ASD, attitudes towards ASD, practices, and self-perception of efficacy in educating children with ASD. Univariate and multivariate analyses examined the correlation between individual and school-level variables with current knowledge of typical child development and ASD. None of the participants had more than a university-level education (i.e., none possessed a master's degree). These results explain why an undergraduate level of education has been deemed insufficient in providing teachers with the skills needed to work with children with ASD [20]. Consistent with prior research, Lian and his colleagues in [21] argues that teachers with previous work experience with special-needs children possessed a significantly more accurate understanding of ASD.

The study by Eseigbe and his colleagues in [22] assessed the knowledge of autism and management challenges among medical doctors in Northern Nigeria. The study aimed to highlight any knowledge gap and management challenges encountered, address them, and improve autism outcomes. The (KCAHW) is a self-administered questionnaire tool to assess the knowledge about childhood autism among health workers. KCAHW was used among 175 medical doctors(participants) attending an annual scientific meeting in northwest Nigeria. A variable knowledge of autism, following assessments with the KCAHW tool, has been reported severally among healthcare providers. Higher mean KCAHW scores in this study could reflect that this study was conducted among medical doctors, as opposed to nurses and other healthcare workers in other studies.

Taylor and his colleagues in [23] studied the Australian standard for diagnosing autism spectrum disorder (ASD) even though there are specific diagnostic services available. They suspected inconsistency in the diagnostic practices of health professionals in Australia. This is the first national study to investigate the diagnostic methods of health professionals from different disciplines across Australia. Respondents were self-selected and may be committed to high standards of care. Two hundred forty-five potential participants opened the survey, with 173 of these individuals proceeding beyond the first question; complete responses were obtained for ninety-nine of the respondents who started the questionnaire, resulting in a completion rate of fifty-eight percent.

Participants completed an anonymous one hundred forty-one-item questionnaire that was presented via Qualtrics (Qualtrics Utah, USA), an online survey platform.

Wainer and his colleague in [24] conducted an internet-based self-directed distance learning program to teach reciprocal limitation training, a naturalistic behavioral intervention to increase imitation in children with ASD. A single-subject multiple baseline design study evaluated the effect of the program on changes in a therapist's (sample 1) and parent's (sample 2) knowledge and behavior and changes in child behavior. Adult participants improved their knowledge and use of the intervention techniques, and child participants improved their imitation rates. Results suggest that a self-directed distance learning program may effectively disseminate evidence-based practices to individuals working with children with ASD. Research by the authors in [25] has indicated that distance learning programs effectively disseminate knowledge to various populations. Hamad and his colleagues in [26] trained fifty-one professionals, paraprofessionals, and family members in principles and procedures of applied behavioral analysis (ABA) using an online distance learning course that included narrated slide presentations, video examples, and application exercises. Participants made satisfactorily significant gains in intervention knowledge from pre-to post-training and reported high satisfaction.

The study's limitation was that the sample size was extremely small, making generalization difficult. Although single-subject methodology allows for a detailed examination of the program's feasibility and efficacy, it is unknown how all the results from the current study would generalize to other parents and other service providers.

Ravindran and his colleague in [27] mention explicitly parents' beliefs about ASD and how their beliefs shape their explanation of signs manifestation, the time they take to seek out intervention, and the type of intervention

they decide to have for their children. Nonetheless, parental perspectives and belief systems about the early signs of ASD and paying attention to them allow the possibility of targeted intervention or more careful monitoring.

**6. Effectiveness of Professional Training on ASD Knowledge and Attitudes**

The second theme identified was improving educators' and allied health care providers' knowledge and attitudes toward ASD through training. Most researchers reported positive impacts of professional training and education on educators' knowledge and attitudes about ASD. For example, Zeleke and his colleagues in [28: 1] found that a week-long training on ASD improved participants' knowledge about ASD symptoms, characteristics, nature, and intervention selection. The participants comprised counselors, social workers, psychologists, nurses, teachers, therapists, and therapeutic care workers. Like Zeleke and his colleagues in [28: 1], Al-Hiary and his colleague in Reference [29: 277] found that 12 hours of training about ASD four times a week was effective in improving ASD knowledge. Before the training, the participants had low levels of ASD knowledge based on the survey administered, however, participants' knowledge increased moderately after the training [29: 286].

Like, the authors in [28: 1] and [29: 86], Johnson and his colleagues in [30: 17] found that professional teacher training in working with students with ASD was effective in improving participants' self-efficacy in working with ASD students. Based on their findings, the authors in [30: 17-18] concluded that there is a need to provide more professional development education to general educators and improve their self-efficacy. Supporting the authors in [28: 1], [29: 286] and [30: 17-18], Kossewska and his colleagues in [31: 18] concluded training program was necessary. Based on their findings, the authors in [31: 18] concluded that a post-autism-specific professional development program can be used to train teachers working with ASD, supporting the implementation of the proposed project.

Also, Petersson-Bloom in [32: 957] findings supported the authors in [28: 1], [29: 286], [30: 17-18], [31: 18] reported findings. Petersson Bloom in [32: 957-958] evaluated the impacts of professional development programs on improving preschool teachers' inclusive education for children with ASD and found increased participants' awareness after the training. Tsilimingras and his colleagues in [33: 78] compared interprofessional clinical practice (IPCP) and experiential training sessions and concluded knowledge about ASD can be exchanged through training. In their article, the authors in [34: 2, 6] argue for increased access to specialized training in ASD psychoeducation and autism spectrum disorders-clinical practice (ASD-CP) components to increase staff perceptions towards challenging behaviors. The authors in [35: 10-12] concluded in their article that many professionals felt the need for better training on ASD. Kossewska and his colleagues in [36: 88] found that teachers expressed a strong need for special ASD training. The authors in [37: 523-526] also supported the effectiveness of training in improving educators' knowledge of ASD. Craig and his colleagues in [37: 523-526] found that the participants met the mastery criterion on ASD knowledge level.

In their systematic review, the authors in [38: 488] found most educators revealed positive attitudes towards ASD.Findings in all the above studies suggest that disseminating short ASD training is beneficial, thus supporting the implementation of training in the proposed project.

## 7. Identifying and Establishing the Problem

The capstone project/study at this institute would help educators, allied health, and direct care support professionals give competent care to children affected with autism. The institute understands this project/study would expand future research by examining the larger context within the institute family using the knowledge, attitude, and better practices model in caring for children with autistic disorders. The current state baseline measures will not compare to the future baseline measurements because, at this time, we do not have any baseline data for the project. The PICOT question for the research study would be as follows: for educators, allied health, and direct support professionals working with autistic children, (P) would an evidence-based practice (ASD-CP) education training caregiving program (I) increase their knowledge, attitudes, and practices dealing with autistic children (O) over 12 weeks (T)?

## 8. Conceptual framework of the study

Concept Mapping changes words into pictures or diagrams visually representing connections [39: 1]. The research design, a quasi-experimental non-randomized pretest, and post-test evaluation, with the pretest occurring before the educational intervention and post-test results after the educational intervention, were visually represented for the project/study to survey whether professionals would benefit from an EBP intervention working with autistic children (see figure 1).

In this project/study, the independent variables of training, education, knowledge, attitude, and practice are being "influenced" to determine the outcome (dependent variable) and see if an evidence-based intervention of knowledge, attitude, and practices increases understanding of ASD competent caregiving.

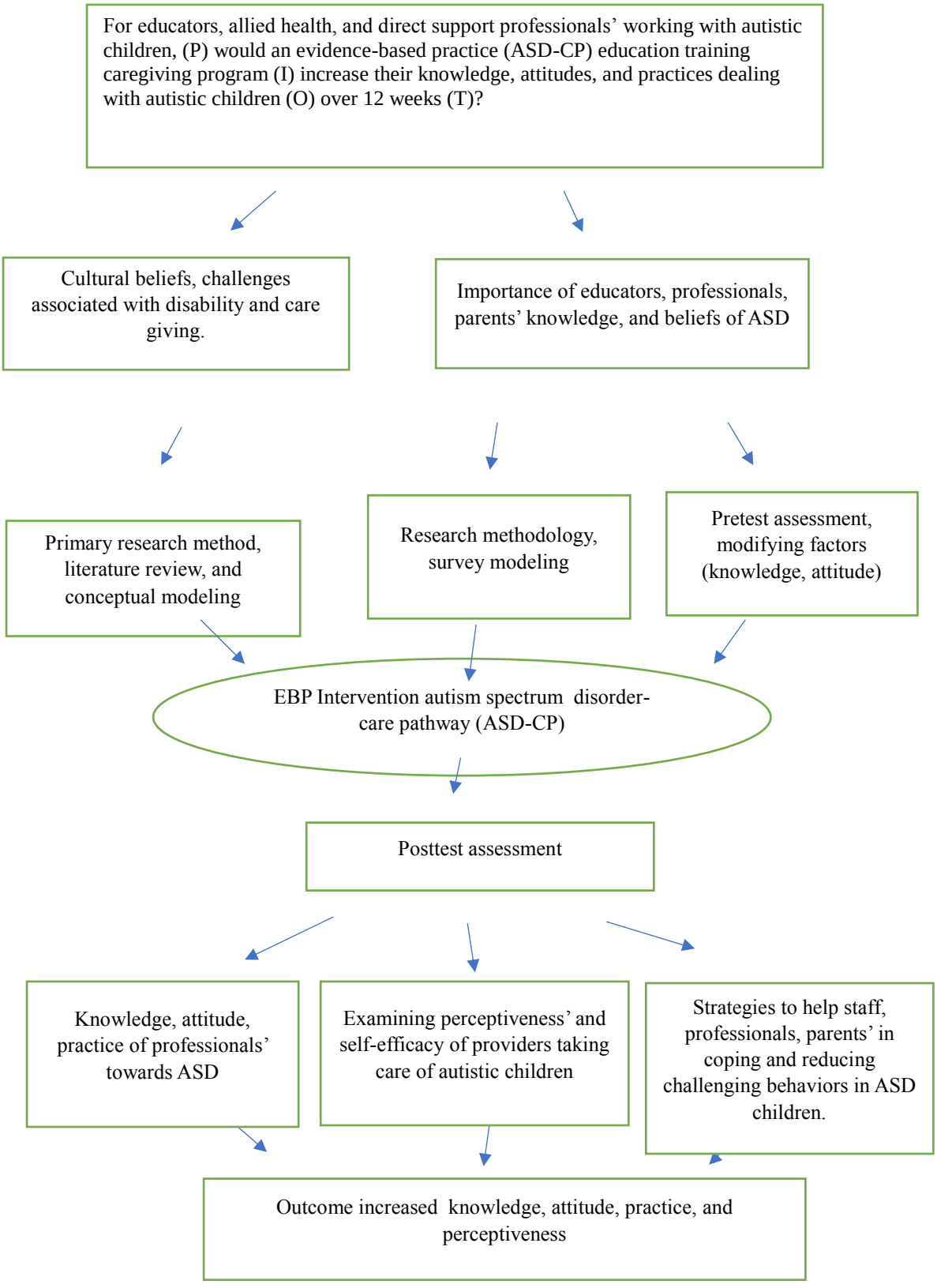


**Figure 1:** Conceptual Framework of the Study

## 9. Study Method and Research Design

This pre-post method approach examined the effectiveness of the care pathway of autism intervention through professional development training to help educators and allied health professionals gain awareness and knowledge. The pre-test occurs before the educational training (intervention) and the post-test after the intervention to assess changes in knowledge, attitude, and practice [40: 479]. In this project/study, the independent variables of training, education, knowledge, attitude, and practice are "influenced" to determine the outcome (dependent variable) and see if an evidence-based intervention of knowledge, attitude, and practices increases understanding of ASD competent caregiving.

A previously validated questionnaire developed by Liu and his colleagues in [19: 5-8] was adopted at the institute to achieve the project objectives of this study. Permission to use excerpts from the original research [21: 190-192] was obtained from the publisher's John Wiley and Sons with license #5255090278887, dated February 23, 2022, for the capstone project. Section 1 of the questionnaires includes demographics to identify gender, qualification, and experience working with autistic children. Section 2(a) consists of twelve questions requiring a Yes/No/I do not know. Section 2(b) is comprised of six questionnaires evaluating attitude, practice, and perception, and Section 2(c) requiring a Yes/No, consists of a questionnaire assessing the knowledge of evidence-based intervention programs for ASD children.

## 10. Inclusion and Exclusion Criteria for the Study

The research project/study would include the target population, i.e., educators/allied health/ direct care professionals working with autistic children at the school of autism and direct care professionals at the institute's residential homes. Inclusion criteria include demographic characteristics, and a scoring criterion would be 79% in sections 2(a) and (c) or A score of 3 or less in section 2(b), and exclusion criteria would be 80% or more in sections 2(a) and (c) and a score of 4 or more on section 2(b) on the pre-test survey questionnaire.

## 11. Autism Spectrum Disorder (ASD-CP) Training

Training consisted of ASD psychoeducation and an overview of ASD-CP components comprised of a visual schedule, including activities typically presented throughout the day and as picture cards.

The coping cards provide information on numerous calming exercises to use as a coping strategy to regulate emotions [41: 3175, 42: 4084]. In a previously validated study, it was noted that ASD-CP components were found to be effective in increasing the staff knowledge levels of ASD and management skills of staff in psychiatric in-patient wards dealing with autistic children. It was also noted that hospital stays were reduced by 40% [41: 3173].The principal investigator shortened the training to 60–90-minute sessions at the institute. Training lining up of ASD-CP components and curriculum as designed in [41: 3175, 42: 4084, 34: 2] were adopted for training at the institute.Two training sessions were conducted to accommodate participants from different locations. One training course was in the conference room at the school of autism, and the second was at a group home of the institute to accommodate direct care professionals. The principal investigator conducted

training assisted by a clinical training specialist from the institute, a board-certified behavior analyst.

**12. Participants in the Study**

The targeted participants were comprised of educators/allied health and direct care professionals caring for autistic children at the institute. Educators and allied health professionals from the autism school, as well as direct care support professionals from eight group homes of the institute, were recruited for the project/ study by distribution of the informed consent and confidentiality form along with the pretest survey questionnaire. Thirty-five packets were distributed over five weeks, and twenty-nine were collected from participants. Two of the twenty-nine participants did not meet the inclusion criteria, resulting in twenty-seven participants (n-27) completing the pretest survey questionnaire. Twenty-two participants (n-22) completed the post-test study after the training. Written informed consent, confidentiality, privacy rights, and authorization were obtained from all participants by the investigator and as guided by the Institute and the University Institutional Review Boards.

**13. Anticipated Findings**

The independent variables of training, education, knowledge, attitude, and practice are "influenced" to determine the outcome (dependent variable) and see if an evidence-based intervention increases the knowledge, attitude, and practices. In the study/project, it is assumed that the intervention will elicit reliable responses and that the respondents will answer the questions honestly.The SMART criteria are widely accepted as an effective goal-setting strategy in behavioral health [43: 616], and the SMART criteria were used for the project as a tool to help serve as a check-in point and planning strategy (see Table 1).

**Table 1:** The SMART Model for the Project/Study

| Specific | Measurable | Achievable | Realistic/ Relevant | Time bound | Comments |
|---|---|---|---|---|---|
| Educators/allied health professionals/direct care staff serving autistic children | Changes in knowledge, attitude, and practice | By 20 percent | By implementing the EBP Intervention (ASD-CP training components) | In 12 weeks | This objective evaluates the effectiveness of one best intervention to influence knowledge and attitude. |

*Note.* The project/study objective is to evaluate the effectiveness of one best intervention and notice changes in knowledge, attitude, and practice by 20% over 12 weeks.

**14. Results**

The outcome's knowledge, attitude, and practice data were translated into a statistical analysis using a paired t-

test. A descriptive analysis was derived for each questionnaire. Specifically, paired samples *t*-test significance levels will be 0.05 for all analyses. All analyses were carried out using the Statistical Package for the Social Sciences (SPSS) version 29.0.

**15. Data Collection**

Educators and allied health professionals from the autism school and direct care support professionals from eight group homes of the institute were recruited for the project by distributing the informed consent and confidentiality form and the pretest survey questionnaire. Thirty-five packets were distributed over five weeks, and twenty-nine packets were collected from participants. Inclusion criteria were a score of less than 79% on sections 2(a) and (c) or A score of 3 or less on section 2(b). The exclusion criteria were a score of 80% or more in sections 2(a) and (c) and a score of 4 or more in section 2(b) of ASD-CP. Out of the twenty-nine participants, twenty-two participants completed the post-test study.

**16. Descriptive Analyses**

Thirteen participants were females ($n$ = 13, 56.5%), and nine were males ($n$ =9, 39.1%). The majority had between five and seven years of experience working with the ASD population ($n$ =6, 27.2%; see Table 2).

**Table 2:** Participant Demographics

| Variable | | n | % |
|---|---|---|---|
| Gender | Males | 9 | 39.1 |
| | Females | 13 | 56.5 |
| Education Level | High school | 6 | 27.2 |
| | Bachelor's degree | 6 | 27.2 |
| | Master's degree | 7 | 31.8 |
| | Ph.D. or higher | 1 | 4.5 |
| | Trade school | 1 | 4.5 |
| | Prefer not to say | 1 | 4.5 |
| Experience ASD population | 0-2 years | 5 | 22.7 |
| | 2-5 years | 5 | 22.7 |
| | 5-7 years | 6 | 27.2 |
| | 7-10 years | 2 | 9.09 |
| | 10+ years | 4 | 18.1 |
| | Prefer not to say | 0 | 0.0 |

*Note.* Out of the total twenty-two participants in the post-test survey, there were thirteen females and nine males. Many of the participants had 5-7 years' experience working with ASD children.

One of the outcomes measured was participants' knowledge of typical child development. As expected, there was a noteworthy percentage increase in all questions measuring participants' knowledge of typical child development. For example, before training, the percentage of correct responses to the first question was 51.7% and increased notably to 81.7% after the training. These results indicate that the training effectively improved participants' knowledge. (see Table 3).

**Table 3:** Participants' Scores Before and After Training on typical child development

| | Before | After |
|---|---|---|
| Question | % Correct | % Correct |
| There is no cause for concern if a three-year-old child can recognize characters but not speak in sentences. | 51.7 | 81.8 |
| It is usual for a one and half-year-old child to have already developed hand preference**s**. | 24.1 | 54.5 |
| A child with poor language skills can appear hyperactive and inattentive. | 62.0 | 72.7 |

*Note.* Scores of typical child development knowledge before and after training showed a notable increase in participants' average scores. Questionnaires adapted from knowledge, attitude, and perceptions of autism spectrum disorders in a stratified sampling of preschool teachers in China [19: 5-8]. Springer Nature. Copyright Reference [19].

The second outcome assessed was participants' knowledge of ASD measured using a knowledge of ASD questionnaire. Also, there was expected to be an increase in participants' understanding of ASD after the training. As expected, there was a notable increase in participants' average correct percentage scores after the training. For example, before the training, only 50% of the participants scored correctly on the survey's first question. However, participants' average score for the survey's first question increased notably to 77.2% after the training. The percentage of correct scores before and after the training for each question is presented in Table 4 and Figure 2. The percentage increase in participants' knowledge of ASD after the training indicates that the training was practical and effective.

**Table 4:** Participants' Scores Before and After Training on ASD knowledge

| Question | % Correct Before | % Correct After |
|---|---|---|
| Children with autism usually grow up to be adults with schizophrenia | 50.0 | 77.2 |
| Children with autism do not show social attachments, even to parents. | 24.1 | 59.0 |
| A child with autism often does better with visual input than auditory input | 58.6 | 95.4 |
| Changing the diet of a child with autism will make a difference in their outcome. | 44.8 | 77.2 |
| Autistic children are not affectionate | 96.5 | 90.9 |
| Autism occurs in less than 10 percent of the population. | 27.5 | 54.5 |
| Autism is curable if diagnosed early and appropriate intervention is provided. | 71.4 | 100 |
| Autism is a psychological problem. | 65.5 | 83.6 |
| With proper treatment, most children with autism outgrow autism. | 79.3 | 95.4 |

*Note.* Average scores on knowledge of ASD before and after training showed increased scores on every questionnaire. Questionnaires adapted from knowledge, attitude, and perceptions of autism spectrum disorders in a stratified sampling of preschool teachers in China [19: 5-8]. Springer Nature. Copyright [19].

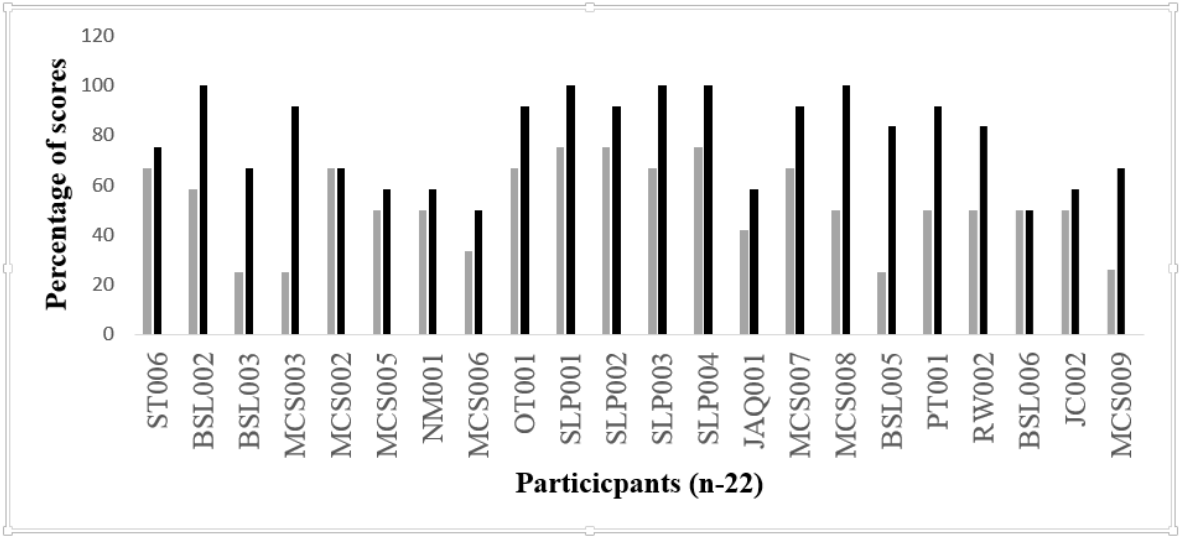


**Figure 2:** Pretest and Posttest Knowledge Data

*Note*. As expected, there was a notable increase in participants' average correct percentage scores after the training. The grey bar diagram represents the pretest scores, and the black bar diagram illustrates the posttest scores after the ASD-CP training program.

In addition, participants' attitudes, interests, and perceived self-efficacy toward individuals with ASD were measured before and after the training. On a scale of 1 to 5, the average participant's score for the first item of the survey was 3.57. However, the average score for the first item of the survey increased to 3.72 after training (see Table 5). Similarly, the increase in average participants' scores of their attitudes, interests, and perceived self-efficacy towards individuals with ASD indicated that the training was practical and effective.

**Table 5:** Participants' Scores on Attitudes, Interests, and Perceived Efficacy Towards the Care of Individual's with ASD Before and After the Training

| Statement | Average Score Before | Average Score After |
|---|---|---|
| Children with special needs should be integrated into mainstream. schools. | 3.57 | 3.72 |
| All preschools should allow special education children to attend classes while waiting for placement. | 3.96 | 4.31 |
| All preschools should have special education teachers and therapists to provide services to children with special needs attending classes there. | 4.52 | 4.77 |
| I feel equipped to handle children with special needs. | 4.21 | 4.31 |
| I am interested in attending training in childhood development and behavioral disorders. | 4.21 | 4.54 |
| If adequately trained, I will have children with special needs in my class. | 4.7 | 4.63 |

*Note*. Participants' attitudes, interests, and perceived self-efficacy towards individuals with ASD before and after training showed an increase in average scores. Questionnaires adapted from knowledge, attitude, and perceptions of autism spectrum disorders in a stratified sampling of preschool teachers in China. [19: 5-8]. Springer Nature. Copyright [19].

Notably, there was an increase in participants' awareness of structured training, relationship development, joint attention, and naturalistic teaching techniques after the training. (see Table 6).

**Table 6:** Participants' approaches devoted to ASD care

| Intervention | Before | | After | |
|---|---|---|---|---|
| | Yes (%) | No | Yes (%) | No |
| Applied behavior analysis. | 27 (100%) | 0 | 22 (100%) | 0 |
| Structured training | 22 (75.8%) | 6 | 18 ( 81.8%) | 4 |
| Relationship development intervention | 18 (62.1%) | 10 | 17 (77.2%) | 5 |
| Joint attention Intervention | 20 (68.9%) | 8 | 17 (77.2%) | 5 |
| Naturalistic teaching techniques | 21 (72.4%) | 8 | 19 (86.3%) | 3 |

*Note*. Approaches devoted to ASD care [44: 9, 10] and guide to providing appropriate interventions to students with autism spectrum disorders. Copyright@2009 National Autism Center.

**17. Inferential Statistics**

Specifically, a paired samples *t*-test was conducted at a .05 significance level. Before the training, the average participants' correct score on knowledge of ASD was 51.93 and increased to 78.78% after the training. The mean difference (26.84) was statistically significant. Specifically, there was sufficient evidence at a .05 level of significance to conclude that participants' average correct scores increased significantly after the training ($t_{(21)} = 6.809$, $p < .001$.(see table 7)

The significance of the results indicates that the training effectively improved participants' knowledge of ASD.

**Table 7:** Paired Sample t-Test of Participants' knowledge of ASD Before and After Training

| | Before | | After | | | |
|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *t* (df) | *p* |
| Knowledge Scores | 51.93 | 16.93 | 78.78 | 18.12 | 6.809 (21) | <.001 |

*Note*. A paired samples *t*-test was conducted at a .05 significance level. Before the training, the average participant's correct score on knowledge of ASD was 51.93 and increased to 78.78% after the training.

## 18. Discussion

Many participants were females ($n$ = 13, 56.5%), and males were $n$ =9 (39.1%). The majority had five to seven years of experience working with the ASD population ($n$ =6, 27.2%). Following ASD-CP, a notable increase in participants' knowledge scores was anticipated after the training. As expected, there was a noteworthy percentage increase in all questions measuring participants' knowledge of typical child development. For example, before training, the percentage of correct responses to the first question was 51.7% and increased notably to 81.7% after the training. These results indicate that the training effectively improved participants' knowledge of typical child development.

The second outcome assessed was participants' knowledge of ASD measured using an understanding of the ASD questionnaire. As expected, there was a notable increase in participants' average correct percentage scores after the training. For example, only 50% of the participants scored correctly on the survey's first question before the training. However, participants' average score for the survey's first question increased notably to 77.2% after the training. In addition, participants' attitudes, interests, and perceived self-efficacy toward individuals with ASD were measured before and after the training. On a scale of 1 to 5, the average participant's score for the first item of the survey was 3.57. However, the average score for the first item of the survey increased to 3.72 after the training. Similarly, the increase in average participants' scores of their attitudes, interests, and perceived self-efficacy towards individuals with ASD indicated that the training was practical and effective. Notably, there was an increase in participants' awareness of structured training, relationship development, joint attention, and naturalistic teaching techniques after the training.

## 19. Limitations of the Study and Future Directions

While the results are thought-provoking, the study at the organization was small, with heterogeneous samples. The study's results reflect some of the educators at the institute and are not generalized to all educators or allied health professionals. Secondly, board-certified participants in behavioral analysis and working with ASD children may have changed the knowledge base of the study/project. Psychometric attitude measurement limitations would have been a fundamental problem. The study was designed with the fewest resources and was easy to implement for assessing improvements in knowledge related to clinical improvements at the institute. The data supports that the training in the ASD-CP pathway was associated with increased staff understanding of ASD and with no cost.

Professional development stability is not known in the study/project. Staff support should be developed, as reported in the article [41: 3178-3179). Future research should be directed toward implementing ASD-CP strategies at the organization.

## 20. Conclusion

In this project/study, the independent variables of training, education, knowledge, attitude, and practice were "influenced" to determine the outcome (dependent variable) and see if an evidence-based intervention increases the knowledge, attitude, and practices. In the study, it was assumed the intervention used would elicit reliable

responses and that the respondents would answer the questions honestly. The chance to participate in the changing trends and educate professionals through these trainings would empower critical thinking. Cardoso and his colleagues in [45: 9-10] argue implementing evidence-based practice (EBP) can offer better care and services. Implementing the program and educating professionals on the desired future state measures will positively impact the organization by delivering EBP care if the proposed project is implemented.

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